REMARKS

Applicant respectfully requests reconsideration of this application as amended. Claims 1-6, 8, 9, and 24 are canceled. Claims 7, 10-23, and 25-29 are currently pending in this application.

Claim Rejections - 35 U.S.C. §103(a)

Claims 7, 10-23, and 25-29 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over Reinhardt (U.S. Patent No. 6,747,243) in view of Allen (U.S. Patent Publication 2004/0182416) and Yogev (U.S. Patent No. 6,799,584).

Response to 35 U.S.C. §103(a) rejections

With regard to the rejection of claims 7, 10-23, and 25-29 under 35 U.S.C. § 103(a) as being unpatentable over Reinhardt in view of Allen and Yogev, applicant submits that the combination of prior art references of Reinhardt, Allen and Yogev would not render the present invention obvious because these references fail to teach an element of the present invention, namely the explosive evaporation, which comprises evaporation and fragmentation of the particle defects.

The present invention presents a laser beam providing energy to a particle defect to cause the defect to undergo explosive evaporation, defined as partially evaporation and partially fragmentation. Thus in the laser ablation process according to the present invention, the particle partially vaporizes and partially breaks into smaller particle fragments.

Applicant submits that Reinhardt fails to teach either evaporating or fragmentizing the particle defects using laser beam. Reinhardt employs a laser beam to provide thermal shock (Reinhardt , Col. 11, line 37; Col. 11, lines 47-48), where the particle undergoes rapid temperature changes, generating expansion/contraction at the contacting surfaces, reducing the adhesion of the particle to the substrate surface, and thus struck loose and may be carried away by a nitrogen flow (Reinhardt, Col. 11, lines 66-67). Thus applicant submits that Reinhardt discloses a laser process where the particle defect is removed intact.

In addition, Reinhardt is silent with respect to evaporate the particle defect. Further, by teaching that the laser tool removes the particles indiscriminant of materials or composition (Reinhardt, Col. 11, line 45-46), applicant submits that Reinhardt teaches away from the invention of using the laser beam to evaporate the defect, since the energy needed for evaporation is highly dependent on materials or compositions. Reinhardt's laser beam process only needs to provide enough energy to heat the particle to cause expansion/contraction (e.g. thermal shock) for reducing adhesion, and not enough to cause evaporation.

With regard to Allen, applicant submits that Allen discloses a process for pulling defect particles off the surface by coating the substrate surface with a transfer medium, and then causing explosive evaporation of a transfer medium (Paragraph [0039], line 11). In the laser process of Allen, the particle defect is also removed intact, only the transfer medium undergoes explosive evaporation, which lifts off the transfer medium layer together with the intact, embedded particle defect (Paragraph [0039], lines 13-14; Fig. 2C). Thus applicant submits that Allen discloses a laser process where the particle defect is removed intact.

In addition, Allen is silent with respect to evaporating the particle defect. The evaporation process according to Allen provides an evaporation of the transfer medium at the substrate surface, generating enough energy to explosively pushing the transfer medium with the embedded defects from the substrate surface.

Thus applicant submits that Allen fails to teach evaporation and fragmentation of defect particle by laser ablation.

With regard to Yogev, applicant submits that Yogev is silent with respect to evaporating the particle defect with the laser.

Further, with regard to defect fragmentation, applicant submits that Yogev teaches away from defect particle fragmentation by a laser ablation process. Yogev discloses that defect particles tend to explode during a laser cleaning process, but teaches away from the present invention by listing potential drawbacks of the particle explosion process, such as substrate surface damage upon the explosion, difficulty of removing particles and particle fragments of different contaminants and large range of sizes (Col. 2, lines 1-3). Further, Yogev discloses that his inventive process substantially reduces or eliminates particle

explosion phenomena (Col. 3, lines 25-27; Col. 4, lines 42-43; Col. 5, lines 19-20). In an exemplary process, Yogev discloses that none of the silicon nitride particles exploded, as compared to a conventional laser cleaning process having more than 80% of the particles exploded.

Applicant submits that the present invention laser ablation process comprises the explosive evaporation of the particle, partially vaporizing and partially breaking the particle into smaller fragments. Applicant submits that the present invention laser ablation process is distinct from Reinhardt's laser ablation process, which employs thermal shock and not vaporization nor fragmentation; from Allen's explosive evaporation process, which vaporizes the transfer medium interface and not vaporization nor fragmentation of the particle; and from Yogev's condensation-based cleaning process preventing fragmentizing and evaporating the defect particles.

Thus applicant submits that Reinhardt teaches away from using laser beam to vaporize the particle defect, and Allen and Yogev are both silent with respect to the process of using laser beam for vaporizing the particle defect. Thus applicant submits that the combination of these prior art would not render obvious the present process of laser ablating, causing partial evaporation of particle defects.

Also, applicant submits that Reinhardt and Allen are both silent with respect to fragmentizing the particle defect, and Yogev teaches away from fragmentizing the particle defect by listing the difficulties associated with such explosion process, and by specifically disclosing preferred embodiments where the explosion process is to be substantially reduced or eliminated. Thus applicant submits that the combination of these prior art would not render obvious the present process of laser ablating, causing partial fragmentation of particle defects.

In sum, applicant submits that the combination of these prior art would not render obvious the present process of laser ablating, causing partial evaporation and partial fragmentation of particle defects.

With respect to the dependent claims, applicant submits that these dependent claims should be allowable, at least for the reason stated above with respect to the independent claims 7, 17 and 25.

In conclusion, applicants respectfully submit that in view of the amendments and arguments set forth herein, the applicable rejections have been overcome.

Pursuant to 37 C.F.R. § 1.136(a)(3), applicant(s) hereby request and authorize the U.S. Patent and Trademark Office to (1) treat any concurrent or future reply that requires a petition for extension of time as incorporating a petition for extension of time for the appropriate length of time and (2) charge all required fees, including extension of time fees and fees under 37 C.F.R. §§ 1.16 and 1.17, to Deposit Account No. 02-2666.

Respectfully submitted,

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